

faces toward the wind. Turbulence and the more rapid movement of both trough and crest than of the middle of the "wave" dissipates the smoke in two or three minutes. In windy, cloudy weather the form of the smoke is essentially the same, for the waves produced in the wind by the unevenness of the ground have vertical movements somewhat like those of local heat convection, though usually on a smaller scale.

7. *Sea breeze or squall front.*—On the front of a sea breeze, the smoke blows inland from the top of the smoke-stack, but is carried up and returned seaward aloft. This has been observed from Blue Hill, Mass., on several occasions. There is the same bow formation on the front of a thunder squall, though the turbulence is so much greater that the bow is not so long.

From these observations of smoke, it seems that in so far as smoke movements make air currents visible, smoke becomes a valuable indicator of the structure of the wind.

THE STRUCTURE OF GUSTS.¹

By Major C. C. TURNER, R. A. F.

[Abstract.]

In a steady wind an airplane itself moves as if in a calm. Thus, if the wind is unsteady the number of gusts encountered in a given time will be the same whether there is a following or a head wind. And if, as anemometers indicate, gusts have no more abrupt onset than end, the effect of a gust from in front or of a lull from behind should be the same. Nevertheless, aviators say they can feel the difference between a head wind and a following one, and that they can climb fastest against the wind. Soaring birds apparently have the same experience. This would seem difficult to explain in any way other than that gusts begin more suddenly than they end. Apparently, we need more refined observations to show what the difference is.—C. F. B.

A VIRGINIA TORNADO.

By Prof. ALBERT W. GILES, University of Virginia.

[Dated: University, Va., Oct. 28, 1918.]

On October 29, 1917, a tornado occurred in the southern part of the State of Virginia that seems worthy of brief record. Gretna, a small village of some 200 inhabitants, situated in the north-central part of Pittsylvania County, 27 miles north of Danville, and on the main line of the Southern Railroad, was directly in the path of the disturbance and suffered severely. As a matter of fact, the destructive effects of the tornado were limited essentially to Gretna itself, its path being traceable but a short distance on either side of the town.

Tornadoes are very rare in Virginia. Greeley in his American Weather records less than five for the western part of the State between the years 1794 to 1881, and no published descriptions of this type of storm as occurring within the confines of the State are known to the writer.

In the study of the Gretna tornado no features new to tornadoes were discovered. It was simply a small storm of its class manifesting the usual phenomena. However, the date of its occurrence, very late in the autumn, is worthy of especial note as well as the lateness of the hour, 10:40 p. m.

Its path from the south-southwest toward the north-northeast may be traced continuously for a distance of about 2 miles, closely paralleling the Southern Railroad. In no place examined was the width of this path greater than 600 feet and locally it was but 150 feet wide. The accompanying map, figure 1, displays the direction of its course through Gretna.

The first evidences of destruction were found about one-fourth of a mile south of Gretna along the left side of the main highway. Here one or two trees had been twisted off and two straw stacks had been blown over. Passing beyond these the tornado crossed the main high-

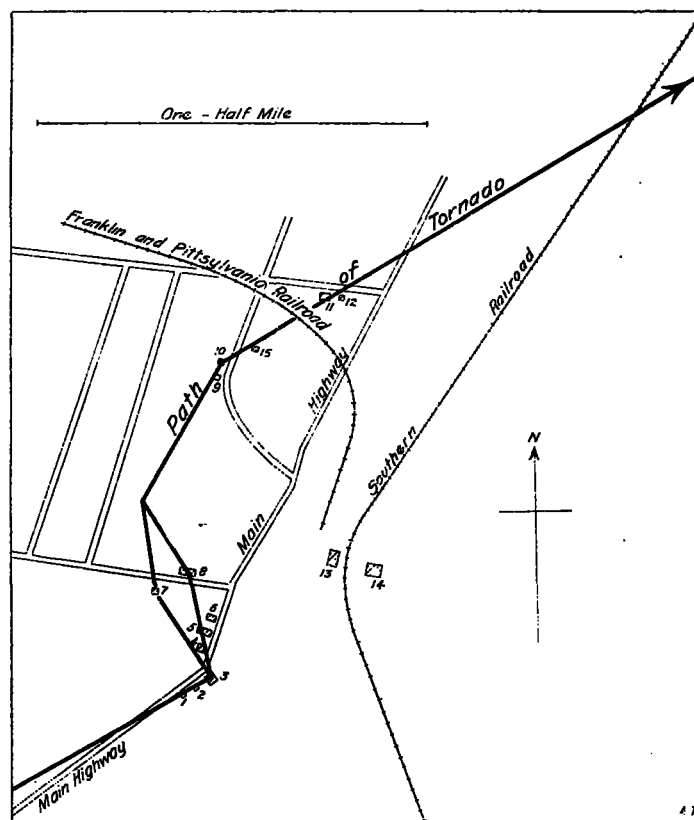


FIG. 1.—Sketch map of Gretna showing the path of the tornado through the village.

1. The Myers home.
2. The Eastman home.
3. Large tobacco warehouse destroyed.
4. Tobacco warehouse damaged.
5. Gretna Livery, Feed, and Sales stable.
6. Post office.
7. The Pickral home.
8. Powell's store.
9. The Eddie Bennett home.
10. The Dr. Powell's home.
11. The Christian Church.
12. The Adams home.
13. Southern Railroad station.
14. Virginia Hotel.
15. The J. E. Bennett home.

way and encountered the houses on the south side of the village. The first was a small frame structure (1, fig. 1) occupied by Mrs. Susie Myers. It was set back 3 or 4 feet and the back end rotated 8 feet from its normal position. Notwithstanding the unusual movements of her home Mrs. Myers preferred to remain in bed rather than to go out and face the storm. The next house (2, fig. 1), 100 feet north of the Myers home, was severely shaken but not damaged. The tornadic whirl apparently lifted over it only to descend with destructive violence on a large tobacco warehouse north-northwest 100 feet beyond. This building, 40 by 80 feet, substantially constructed of boards and three stories high, was totally destroyed (3, fig. 1).

¹ *Aeron. Journ.*, London, 22: 285-6, 1918.